WHAT IS CLAIMED IS:

1. A process for the preparation of improved cellulose pulps in which defibered cellulose pulps are screened for removal of shives, fibers with low bonding ability are removed in hydrocyclones, and rejects from the hydrocyclone treatment are treated in refiner, characterized in the combination of the following characteristics:

a) the base end outflow diameter (Db) of the hydrocyclones being less than 14 IO mm

b) the distance (Lu) between the inner base end outflow opening and the narrowest part of the apex opening being greater than 400 mm, and

c) the ratio between the volumetric flow (Qa) through the apex opening and the volumetric flow (Qf) through the inlet opening or openings of each hydrocyclone being regulated to lie within the interval 0.10 - 0.60.

2. The process of claim 1, in which the rejects from the hydrocyclone treatment are treated in a separate refiner stage.

3. The process of claim 1 - 2, in which the cellulose pulp is chemical pulp and the ratio Qa/Qf is kept within the interval 0.10 - 0.25 in the main fractionation stage.

4. The process of claim 1 - 2, in which the cellulose pulp is thermomechanical pulp (TMP) and the ratio Qa/Qf is kept within the interval 0.20 - 0.40, preferably 0.15 - 0.35.

5. The process of claim 1 - 2, in which the cellulose pulp is chemimechanical pulp (CTMP) and the ratio Qa/Qf is kept within the interval 0.10 - 0.30.

6. The process of claim 1 - 5, in which the separation of fibers with low bonding ability is carried out in several different hydrocyclone stages.

7. The process of claim 6, in which two hydrocyclone stages are used, whereby Qa/Qf in the first stage is kept within the interval 0.10 - 0.40, and Qa/Qf in the second stage is kept within the interval 0.05 - 0.25.

8. The process of claim 1 - 7, in which the ratio between the length (Lc) of the hydrocyclone chamber and the greatest inner cone diameter (Dc) of the hydrocyclones is kept within the interval 5.2 - 6.5.

9. The process of claim 1 - 8, in which the ratio between the base outflow diameter (Db) and the greatest cone diameter (Dc) of the hydrocyclones is kept within the interval 0.10 - 0.20.

10. The process of claim 1 - 9, in which the ratio between the apex outflow diameter (Da) and the greatest cone diameter (Dc) of the hydrocyclones is kept within the interval 0.18 - 0.30.

11. The process of claim 1 - 10, in which the ratio between the base outflow diameter (Db) and the apex outflow diameter (Da) of the hydrocyclones is kept less than 1.

12. The process of claim 1 - 11, in which rejects from the hydrocyclones for separation of fibers with low bonding ability is treated in hydrocyclones designed for separation of sand, bark, and heavy particles.

13. The process of claim 12, in which the ratio between the volumetric flow through the apex opening (Qa) and the volumetric flow through the inlet opening (Qf) in the hydrocyclones for separation of heavy particles is kept within the interval 0.05 - 0.10, and the ratio between the base outflow diameter (Db) and the apex outflow diameter (Da) is kept greater than 1.

14. The process of claim 12 - 13, in which the separation of heavy particles is carried out in several hydrocyclone stages.

15. A modification of the process according to claim 1 - 14 for the preparation of improved cellulose pulps in which defibered cellulose pulps are screened for removal of shives, fibers with low bonding ability are removed in hydrocyclones, and rejects from the hydrocyclone treatment are treated in refiner, characterized in the combination of the following characteristics:

a) the distance (Lu) between the inner base end outflow opening and the narrowest part of the apex opening being kept greater than 400 mm

b) the ratio between the volumetric flow (Qa) through the apex opening and the volumetric flow (Qf) through the inlet opening or openings of each hydrocyclone being regulated to lie within the interval of from 0.08 to 0.60, and

c) the base end outflow channel of each hydrocyclone being provided with a centrally and axially arranged, blocking device (B) of circular cross section, the ratio of the diameter (Dd) at the end (E) of this blocking device to the diameter (Db) of the base outflow opening being kept within the interval of from 0.1 to 1.2.

16. The process of claim 15, in which the ratio of the diameter (Dd) of the blocking device to the diameter (Db) of the base outflow opening is being kept within the interval of from 0.1 to 0.9.

17. The process of claim 16, in which the blocking device is arranged within a central outlet tube (T) at the base end of the hydrocyclone, and extending axially from the base outflow opening into the hydrocyclone chamber.

18. The process of claim 17, in which the blocking device is arranged extending a distance of 0 to 5 times the diameter of the base outflow opening (Db) into the hydrocyclone chamber.

19. The process of claim 15, in which the blocking device is arranged within a central outlet tube (T) at the base end of the hydrocyclone and extending axially with its end (E) within this tube.

20. The process of claim 19, in which the end (E) of the blocking device is arranged at a distance of 0 to 5 times the diameter of the base outflow opening (Db) in the flow direction from the base outflow opening.

21. The process of claim 19 - 20, in which the central tube (T) is widening in the flow direction, and the diameter (Dd) of the end (E) of the blocking device is kept greater than the diameter (Db) of the base outflow opening.

22. An apparatus for application of the process according to claim 1 - 14, in which cellulose pulps are screened, comprising hydrocyclones C for separation of fibers with low bonding ability and device R for refining rejects from the hydrocyclones C, characterized by the combination of the following characteristics:

a) the base end outflow diameter Db of the hydrocyclones being less than 14 mm

b) the distance Lu between the inner base end outflow opening and the narrowest part of the apex opening of the hydrocyclones being greater than 400 mm

c) means P,V for establishing a volumetric flow Qa through the apex opening of the hydrocyclones that relates to the volumetric flow Qf through the inlet opening or openings of each hydrocyclone, such that the ratio Qa/Qf is within the interval 0.10 - 0.60.

23. An apparatus according to claim 22, in which the ratio between the length Lc of the hydrocyclone chamber and the greatest cone diameter Dc of the hydrocyclones is within the interval 5.2 - 6.5, the ratio between the base outflow diameter Db and the greatest cone diameter Dc of the hydrocyclones is within the interval 0.10 - 0.20, the ratio between the apex outflow diameter Da and the greatest cone diameter Dc of the hydrocyclones is within the interval 0.18 - 0.30, and the ratio between the base outflow diameter Db and the apex outflow diameter Da is less than 1.

24. An apparatus for application of the process according to claim 15 - 21 in which cellulose pulps are screened, comprising hydrocyclones C for separation of fibers

with low bonding ability, and device R for refining rejects from the hydrocyclones C, characterized by the combination of the following characteristics:

a) the distance Lu between the inner base end outflow opening and the narrowest part of the apex opening of the hydrocyclones being greater than 400 mm

b) means P,V for establishing a volumetric flow Qa through the apex opening of each hydrocyclone that relates to the volumetric flow Qf through the inlet opening or openings of each hydrocyclone, such that the ratio Qa/Qf is within the interval 0.08 - 0.60

c) the base end outflow channel of the hydrocyclones being provided with a centrally and axially arranged, blocking device B of circular cross section, the ratio of the diameter Dd of this blocking device to the diameter Db of the base outflow opening being within the interval of from 0.1 to 1.2.

25. The apparatus of claim 24, in which in which the ratio of the diameter Dd of the blocking device at the end E to the diameter Db of the base outflow opening is being kept within the interval from 0.1 to 0.9.

26. The apparatus of claim 25, in which the blocking device B is arranged within a central outlet tube T at the base end of the hydrocyclone, and extending axially from the base outflow opening into the hydrocyclone chamber.

27. The apparatus according to claim 26, in which the end E of the blocking device B is arranged at a distance of 0 to 5 times the diameter Db of the base outflow opening into the hydrocyclone chamber.

28. An apparatus according to claim 24, in which the blocking device B is arranged within a central outlet tube T at the base end of the hydrocyclone and extending axially with its end E within this tube.

29. The apparatus of claim 28, in which the end E of the blocking device is arranged at a distance of 0 to 5 times the diameter Db of the base outflow opening in the flow direction from the base outflow opening.

30. The apparatus of claim 28 - 29, in which the central tube T is widening in the flow direction, and the diameter Dd of the end E of the blocking device is kept greater than the diameter of the base outflow opening Db.

31. An apparatus according to claim 24 - 30, in which the ratio between the length Lc of the hydrocyclone chamber and the greatest cone diameter Dc of the hydrocyclones is within the interval 5.2 - 6.5, the ratio between the base outflow diameter Db and the greatest cone diameter Dc is within the interval 0.15 - 0.35, the ratio between the apex outflow diameter Da and the greatest cone diameter Dc is within the interval 0.18 - 0.30, and the ratio between the base outflow area and the apex outflow area is less than 1.

32. An apparatus according to claim 22 - 31, which also includes hydrocyclones D for the separation of sand, bark and heavy particles for treatment of rejects from the hydrocyclones C.